Larval Myogenesis in the Articulate Brachiopod Argyrotheca cordata (Risso, 1826)

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Published in:
Journal of Morphology

Publication date:
2008

Document version
Early version, also known as pre-print

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Brachiopoda is a metazoan phylum with a fossil record dating back to the Lower Cambrium and comprises over 12000 extinct and approximately 400 recent species. Despite some recent progress using mainly palaeontological and molecular datasets the discussion concerning the phylogenetic position of Brachiopoda remains unsettled. While some classic analyses employing morphological data assign Brachiopoda to Deuterostomia, recent molecular data propose a sister group relationship of Spiralia to a clade Lophophorata that unites Brachiopoda, Ectoprocta, and Phoronida.

In order to contribute new developmental and micromorphological data to this debate we investigated muscle formation in larvae of the brooding articulate brachiopod *Argyrotheca cordata* using immunocytochemistry combined with confocal laser scanning microscopy. Full grown larvae are three-lobed and express two pairs of bristles. During larval development the first anlagen of the musculature develop in the bristle pouches and the pedicle lobe. Late stage larvae show a network of longitudinal muscles running from the apical to the pedicle lobe as well as transversal muscles situated in the apical lobe. Strong muscles attach to both the bristles and the pedicle lobe. Our work reveals only few similarities between the larval myoanatomy and myogenesis of *A. cordata* and the hitherto investigated phoronid and ectoproct species, which may account for an early distinct evolutionary pathway of the general ontogeny of all three phyla soon after the split from their last common ancestor.

Keywords: Immunocytochemistry, Argyrotheca cordata, Myogenesis, brachiopod larvae